NORTH CAROLINA DIVISION OF AIR QUALITY

Air Permit Review

Permit Issue Date:

Region: Wilmington Regional Office
County: New Hanover
NC Facility ID: 6500347
Inspector's Name: Linda Willis
Date of Last Inspection: 11/06/2015
Compliance Code: 3 / Compliance - inspection

Facility Data

Applicant (Facility's Name): Wilbara, LLC

Facility Address:
Wilbara, LLC
4620 Highway 421 North
Wilmington, NC 28401

SIC: 2819 / Industrial Inorganic Chemicals
NAICS: 325188 / All Other Basic Inorganic Chemical Manufacturing

Facility Classification: Before: Title V **After:** Title V
Fee Classification: Before: Title V **After:** Title V

Permit Applicability (this application only)

SIP: 02D .0530, 02D .0614
NSPS: Subpart H
NESHAP: N/A
PSD: N/A
PSD Avoidance: N/A
NC Toxics: N/A
112(r): N/A
Other: N/A

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Randy Moore (910) 274-0045 4620 Highway 421 North Wilmington, NC 28401	Randy Moore (910) 274-0045 4620 Highway 421 North Wilmington, NC 28401	Randy Moore (910) 274-0045 4620 Highway 421 North Wilmington, NC 28401

Application Data

Application Number: 6500347.16A
Date Received: 04/12/2016
Application Type: Renewal
Application Schedule: TV-Renewal

Existing Permit Data
Existing Permit Number: 09904/T01
Existing Permit Issue Date: 04/09/2012
Existing Permit Expiration Date: 03/31/2017

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP
2015	166.91	9.38	0.0100	0.1300	17.06	---	--- [---]
2014	119.92	9.20	---	0.1700	17.06	---	--- [---]
2013	87.67	8.75	---	0.0700	14.34	---	--- [---]
2012	79.54	8.60	---	0.0700	14.34	---	--- [---]
2011	86.24	8.25	---	0.0700	15.78	---	--- [---]

Review Engineer: Urva Patel

Review Engineer's Signature: **Date:**

Comments / Recommendations:
Issue 09904/T02
Permit Issue Date:
Permit Expiration Date:

1. Purpose of Application and Facility Description

Currently, this facility holds Title V Permit No. 09904T01 with an expiration date of March 31, 2017. The Title V renewal application (Application No. 6500347.16A) was received on April 12, 2016, or at least nine months prior to the expiration date, as required by General Permit Condition 3.K. Therefore, the existing permit shall not expire until the renewal permit has been issued or denied. All terms and conditions of the existing permit shall remain in effect until the renewal permit has been issued or denied.

2. Facility Description

Wilbara, LLC (Wilbara), a subsidiary of Dulany Industries, Inc., owns and operates a sulfuric acid manufacturing plant in Wilmington, North Carolina with a maximum production capacity of 575 tons per day (tpd).

Elemental sulfur is received by railcar and unloaded into a pit. The pit feeds a storage tank which then feeds a smaller tank. The small tank feeds the sulfur furnace. Combustion air entering the furnace goes through a drying tower to remove moisture. The sulfur is "burned" to form SO_2. The exiting gas stream is sent through a waste heat boiler before entering the first converter stage. The steam from the waste heat boilers is used elsewhere in the facility. A portion of it is also sold to the Invista plant located next door. There are four converter stages. Each one converts some of the SO_2 to SO_3 in the presence of oxygen and a catalyst. This is an exothermic reaction. The gas leaving each stage is cooled (and the heat recovered) before entering the next stage. The gas exiting the final adsorption tower passes through a twelve candle mist eliminator before exiting the stack. The final concentration of the acid is usually in the 93 - 98.5% range, depending on the customer.

3. History / Background / Application Chronology

The following list provides a very brief summary of Title V permit revisions for this facility:

Permit History Since Last Permit Renewal

September 16, 2008	The Air Permit No. 09904R00 issued. This permit authorized the construction of a Greenfield sulfuric acid plant. Major source PSD review required for sulfur dioxide and sulfuric acid mist.
December 15, 2010	Initial startup of the facility.
April 09, 2012	The Air Permit No. 09904T01 issued. This was the initial Title V Operating Permit.

Application Chronology

April 12, 2016	Received application (Application No. 6500347.16A) Title V permit renewal.
April 13, 2016	Sent acknowledgement letter indicating that the permit renewal application was complete
October 25, 2016	Received Email from Mr. Randy Moore for addition of generator as an "insignificant activity"
December 19, 2016	Received CAM Plan documents

4. Summary of Changes to the Existing Permit (Permit No. 09904T01)

Page No.	Section	Description of Changes
Cover Letter	N/A	Updated cover letter for application date, permit numbers, date, PSD increment statement and Chief name.
Permit Cover	N/A	Inserted new issuance and complete application date and application number
--	ATTACHMENT	Added standby generator (**ID No. I-SG-01**)
Cover and throughout	Cover and throughout	Updated regulation references from "2D" and "2Q" to "02D" and "02Q" to be consistent with regulation nomenclature.
5	2.1 A.3.g.ii	Corrected reference to 02D.2610 (i.e. .2610 instead of .2601)
6	2.1 A.5	Added permit condition for 15A NCAC 02D .0614, Compliance Assurance Monitoring

Page No.	Section	Description of Changes
7-15	Section 3	Updated the General Conditions to version 4.0.

5. Compliance Status

The DAQ has reviewed the compliance status of this facility. During the most recent inspection conducted on August 24, 2016, Linda Willis of the Wilmington Regional Office (WiRO) indicated that the facility appeared to be operating in compliance with all applicable requirements. Additionally, a signed Title V Compliance Certification (Form E5) indicating that the facility was in compliance with all applicable requirements, was submitted with Application No. 6500347.16A on April 12, 2016.

Five Year Compliance History:

- On February 8, 2012, an EPA Method 8 sulfuric acid mist emission stack test was performed on ES-01 (a double adsorption sulfuric acid manufacturing plant). The sulfuric acid mist emission test indicated the exceedance of the applicable Best Available Control Technology (BACT) limit. On February 22, 2012 the facility repaired the leakage of one of the 12 mist eliminator candles. The acid plant operated every day from February 8, 2012 through February 21, 2012. ES-01 was retested for sulfuric acid mist emission on February 29, 2012. The results of the test indicated the plant was back in compliance. On June 12, 2015 the Wilmington Regional Office issued Notice of Violation/ Notice of Recommendation (NOV/NRE) for exceedance of the applicable BACT limitation pursuant to 15A NCAC 02D .0530.
- The DAQ review of the 2012 fourth quarter report for the SO_2 continuous emissions monitoring system (CEMS) sources (with percent monitor downtime) and a phone conversation with Mr. Randy Moore of Wilbara, LLC confirmed that the facility had exceeded applicable monitor downtime for the 2012 fourth quarter. On February 7, 2013 the Wilmington Regional Office issued a NOV/NRE for failure to exercise proper O & M practices on ES-01 for SO_2 CEMS pursuant to 15A NCAC 02D .0524 "40 CFR 60, Subpart A".

All violations have since been resolved.

6. Regulatory Review for A Double Adsorption Sulfuric Acid Manufacturing Plant (ES-01)

A. 15A NCAC 02D .0517: EMISSIONS FROM PLANTS PRODUCING SULFURIC ACID

This section of the North Carolina State Implementation Plan (SIP) limits emissions from all sulfuric acid plants as follows:

- Sulfur dioxide (SO_2) emissions shall not exceed 27 pounds per ton of 100% sulfuric acid produced.
- Sulfuric acid mist (H_2SO_4) emissions shall not exceed 0.5 pounds per ton of 100% sulfuric acid produced.

Each of these limits are less stringent than the applicable standards pursuant to the New Source Performance Standard (NSPS) for Sulfuric Acid Plants pursuant to 40 CFR 60, Subpart H, to which this facility is also subject. The testing, monitoring, recordkeeping portions of this section of the permit reference the NSPS requirements. Demonstration of compliance with the NSPS shall be sufficient to demonstrate compliance with this SIP standard.

B. 15A NCAC 02D .0519: CONTROL OF NITROGEN DIOXIDE AND NITROGEN OXIDES EMISSIONS

This section of the North Carolina SIP limits nitrogen oxide (NOx) emissions from all sulfuric acid plants to no greater than 5.8 pounds per ton of 100% sulfuric acid produced.

The Permittee conducted an initial performance test of the sulfuric acid plant on February 9, 2011, which showed a NOx emission rate of 0.09 lbs/ton while operating at greater than 90% of the 24-hour production rate of 575 tons per day (tpd). Because the tested emission rate is less than 2% of the allowable rate, the permit does not include any monitoring, recordkeeping or reporting requirements to demonstrate continued compliance with the standard.

* NOTE: The tested emission rate also confirmed that the construction of the sulfuric acid plant resulted in a potential NOx emission rate of less than 40 tons per year (tpy). At the maximum production rate of 575 tpd,

potential NOx emissions from the plant are less than 10 tpy. Therefore, the construction of this sources did not trigger PSD requirements for major sources of NOx.

C. 15A NCAC 02D .0524: NSPS (40 CFR 60, SUBPART H – Sulfuric Acid Plants)

The NSPS for Sulfuric Acid Plants limits emissions from all sulfuric acid plants on a 3-hour average as follows:

- SO_2 emissions shall not exceed 4 pounds per ton of 100% sulfuric acid produced.
- H_2SO_4 emissions shall not exceed 0.15 pounds per ton of 100% sulfuric acid produced.
- Visible emissions shall not exceed 10 percent opacity.

The initial stack test, conducted on February 9, 2011, showed an SO_2 emission rate of 0.91 lbs/ton, which is less than 25% of the NSPS standard. In accordance with the NSPS, the facility is also required to measure SO_2 emissions using a CEMS. As discussed below, this CEMS is also used to demonstrate compliance with the BACT limit pursuant to 15A NCAC 02D .0530.

The initial stack test, conducted on February 9, 2011, showed an H_2SO_4 emission rate of 0.026 lbs/ton, which is less than 20% of the NSPS standard. As discussed below, annual stack testing for H_2SO_4 emissions will be required to demonstrate compliance with the BACT limit pursuant to 15A NCAC 02D .0530.

The initial Method 9 observation of visible emissions, conducted on February 9, 2011, showed a visible emission rate of 2.1% opacity, which is less than 25% of the NSPS standard. The permit requires the Permittee to observe the emission point of the sulfuric acid plant **(ID No. ES-01)** once a month for any visible emissions above normal. If visible emissions from this source are observed to be above normal, the Permittee must either (1) take appropriate action to correct the above-normal emissions as soon as practicable and within the monitoring period and record the action taken as provided in the recordkeeping requirements below or (2) perform a Method 9 test for 12 minutes to demonstrate that the visible emissions are no greater than 10% opacity. Continued compliance with the NSPS requirements is expected.

D. 15A NCAC 02D .0530: PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

The construction of this sulfuric acid plant **(ID No. ES-01)** triggered major source review under the Prevention of Significant Deterioration (PSD) requirements pursuant to 15A NCAC 02D .0530 for sulfur dioxide and sulfuric acid mist. The following BACT emission standards apply to this source on a rolling 3-hour average:

- SO_2 emissions shall not exceed 2.3 pounds per ton of 100% sulfuric acid produced.
- H_2SO_4 emissions shall not exceed 0.075 pounds per ton of 100% sulfuric acid produced.

As discussed above, the initial stack test conducted on February 9, 2011 showed an SO_2 emission rate of 0.91 lbs/ton and an H_2SO_4 emission rate of 0.026 lbs/ton. To demonstrate continuing compliance with the SO_2 standard, the Permittee is required to operate a CEMS as provided in the NSPS for Sulfuric Acid Plants, and as further detailed in the PSD portion of the permit. To demonstrate continuing compliance with the H_2SO_4 standard, the Permittee will be required to perform an annual performance test. Continued compliance with the PSD/BACT requirements is expected.

State-Enforceable Only

E. 15A NCAC 02D .1100. TOXIC AIR POLLUTANT EMISSIONS LIMITATIONS AND REQUIREMENTS

Sulfuric acid (H_2SO_4) is a state-regulated toxic air pollutant. As part of the initial performance test, the Permittee conducted a compliance demonstration to show that, at the following emission rates, ambient impacts of H_2SO_4 would be less than acceptable ambient levels (AALs) established in 15A NCAC 02D .1100:

- 2.4 lbs/hr
- 57.7 lbs/day

At the tested H_2SO_4 emission rate of 0.026 lbs per ton of 100% sulfuric acid produced and the sulfuric acid plant's maximum production rate of 575 tons/day, the potential daily emission rate is just under 15 lbs/day (0.625 lbs/hr). Demonstration of compliance with the BACT limit for H_2SO_4 as described above is sufficient to demonstrate

compliance with the state-enforceable TAP standard. No additional monitoring, recordkeeping, or reporting requirements were added to the permit to demonstrate compliance with this standard.

Changes per the Title V Permit Renewal:

- Added CAM requirements, 15A NCAC 02D .0614, for the vertical mist eliminator system (ID No. ME-01). Further discussion follows below in Section 7.

7. NSPS, NESHAP/MACT, NSR/PSD, 112(r), CAM:

NSPS

The facility is subject to New Source Performance Standards (NSPS), 40 CFR 60.

- 40 CFR 60, Subpart H:
  New Source Performance Standards [40 CFR 60, Subpart H – Sulfuric Acid Plants] is applicable to ES-01. The facility is required to comply with all applicable provisions including the notification, testing, reporting, record-keeping, and monitoring requirements. The permit condition has been modified to reflect the most current emissions monitoring language. Continued compliance with this regulation is expected.
- 40 CFR 60, Subpart JJJJ:
  The facility has requested to add a 150 kW natural gas-fired standby emergency generator (**ID No. I-SG-01**) as an insignificant activity. This emergency generator is exempt from permitting due to 15A NCAC 02Q .0503(8). This source is subject to NSPS Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines). The potential emissions associated with the emergency generator (**ID No. I-SG-01**) are included in the table below. The potential emissions were calculated using the NC DEQ emissions spread-sheet for small natural gas-fired engines.

Air Pollutants	**Natural Gas-Fired Engine - 150kW Potential Emissions, Tons per year**
PM	0.64
PM_{10}	0.64
$PM_{2.5}$	0.64
SO_2	0.52
NOx	9.69
CO	6.13
VOC	19.02
Total HAPs	2.52E+01 lb/yr
Hours in operation	< 500 hours per calendar year

An insignificant activity means any activity
"...whose emissions potential emission of particulate, sulfur dioxide, nitrogen oxides, volatile organic compounds, and carbon monoxide before air pollution control devices, i.e., potential uncontrolled emissions, are each no more than five tons per year and whose potential emissions of hazardous air pollutants before air pollution control devices, are each below 1000 pounds per year."
Since the uncontrolled emissions of HAPs from the proposed emission source are less than 1,000 pounds per year and criteria pollutants emissions are less than five tons per year as shown in the calculations above, the standby emergency generator (**ID No. I-SG-01**) meets the criteria for insignificant activities under 15A NCAC 02Q .0503(8).

NESHAP/MACT

This facility is a minor source for HAPs emissions and NOT subject to any major source MACT. This permit renewal does not change this status.

NSR/PSD

This facility is one of the specific source categories listed in the PSD regulations. Therefore, the threshold for this facility is 100 tons per year rather than 250 tons per year. The construction of the sulfuric acid plant (ID No. ES-01)

defined this facility as a major source under the Prevention of Significant Deterioration (PSD) requirements pursuant to 15A NCAC 02D .0530 for sulfur dioxide and sulfuric acid mist. This permit renewal does not change this status.

Pollutant	Emission Limit
Sulfur Dioxide	2.3 lb/ton of 100% sulfuric acid produced (rolling 3-hour average)
Sulfuric Acid Mist	0.075 lb/ton of 100% sulfuric acid produced (3-hour average)

The Permittee shall conduct an annual test of the sulfuric acid plant to demonstrate compliance with the sulfuric acid standard. The permittee shall monitor and maintain records of the average sulfuric acid production rate on a 12-month rolling basis, in tpy.

112(r)

This facility is NOT subject to the requirements of the Chemical Accident Release Prevention Program, Section 112(r) of the Clean Air Act requirements because it does not store any of the regulated substances in quantities above the thresholds in 112(r). This permit renewal does not change this status.

CAM

Pursuant to 40 CFR 64.2, the provisions of the Compliance Assurance Monitoring (CAM) rule are applicable to emission units that meet all of the following criteria:

Criteria #1: The unit is subject to an emission limitation AND uses a control device to achieve compliance with the limit;
Criteria #2: The unit has pre-control potential emissions that are equal to or greater than 100% of the amount (in tpy) required for a source to be classified as a major source (i.e., 100 tpy of any criteria pollutant or 10 tpy of any HAP, North Carolina); and,
Criteria #3: The unit is not exempt under 40 CFR 64.2(b).

The following table summarizes CAM applicability at Wilbara, LLC:

Emission Unit	Criteria #1: Does the Source Use a Control Device?	Criteria #2: Pre-control PTE ≥100% of major source thresholds?	Criteria #3: Exempt Under 40 CFR 64.2(b)?	CAM Source?
ES-1	**H_2SO_4; ME-01 (Vertical tube mist eliminator system)**	**H_2SO_4: Yes***	**No**	**Yes**

* The mist eliminator is installed to control sulfuric acid emissions to meet a BACT limitation pursuant to 15A NCAC 02D .0530.

As per preconstruction review (Air Permit No. 09904R00), estimated uncontrolled sulfuric acid emissions from the facility are greater than 100 tpy, as the uncontrolled acid mist emission factor is estimated to be 2.2 lb H_2SO_4 per ton of acid produced. Due to concern with the H_2SO_4 emission factor, CAM applicability was reevaluated for H_2SO_4 emissions and confirmed by Mr. Mark Cuilla and Ms. Linda Willis of the WiRO. The facility indicated an uncontrolled acid mist emission factor for recovered sulfur of 0.348-0.8 lb H_2SO_4 per ton of acid produced and claimed Molten Sulfur (Recovered Sulfur) as their raw material on September 19, 2016 (during 1st Title V renewal).

Theoretical Data:
At a maximum production rate of 575 TPD, potential pre-control device H_2SO_4 emissions from the facility are less than 100tpy, as shown in the following equation:

Best Case Scenario:
(575 Ton acid/Day) * (0.348 lb H_2SO_4/ Ton acid) * (365 Day/Year) * (Ton H_2SO_4/ 2000 lb H_2SO_4)
= 36.52 ton H_2SO_4 / Year

Worst Case Scenario:
(575 Ton acid/Day) * (0.8 lb H_2SO_4/ Ton acid) * (365 Day/Year) * (Ton H_2SO_4/ 2000 lb H_2SO_4)
= 83.95 ton H_2SO_4 / Year

Actual Data:
Based on 2016 Stack Test data, H_2SO_4 emission factor: 0.058 lb/ton

H_2SO_4 emissions
= (0.058 lb/Ton) * (204795 Ton/yr)
= 5.94 Ton/yr

Given Mist Eliminator Efficiency = 99.5%

Pre-controlled H_2SO_4 emission
= 5.94 / (1 – 0.995)
= 1188 Ton/yr

Therefore, the mist eliminator is subject to the CAM requirements, based on pre-control potential emissions estimates. CAM conditions will be added to the permit under this permit renewal.

8. Facility Emission Review

Actual emissions for 2011 through 2015 are reported in the header of this permit review.

9. Public Notice/EPA and Affected State(s) Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit, and each final permit shall be provided to EPA. Also pursuant to 02Q .0522, a notice of the DRAFT Title V Permit shall be provided to each affected State at or before the time notice is provided to the public under 02Q .0521 above. South Carolina is the only area within 50 miles of the facility and will be notified accordingly.

10. Other Regulatory Considerations

- Application fee is NOT required for Permit Application No. 6500347.16A.
- A Professional Engineers Seal is NOT required for Permit Application No. 6500347.16A.
- A zoning consistency determination is NOT required for Permit Application No. 6500347.16A.
- A 30-day public notice and 45-day EPA review is required for this application.

11. Recommendations/Conclusion:

The permit renewal application for Wilbara, LLC in Wilmington, New Hanover County, NC has been reviewed by DAQ to determine compliance with all procedures and requirements, as specified in the permit. The Wilmington Regional Office has made comments on the draft permit and permit review. The DAQ recommends the issuance of Air Permit No. 09904T02.